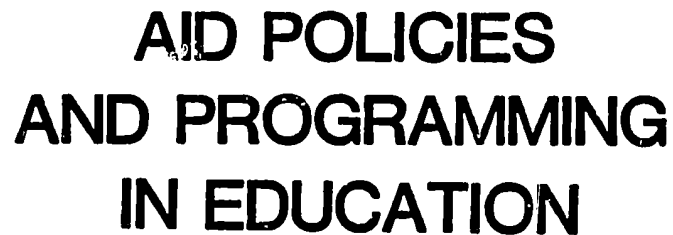


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VOLUME II:
THE ROLE OF EDUCATION
IN DEVELOPMENT:
A SYNTHESIS OF RECENT LITERATURE

SUBMITTED TO AID/PPC

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AID POLICIES AND PROGRAMMING IN EDUCATION

**VOLUME II: THE ROLE OF EDUCATION IN DEVELOPMENT:
A SYNTHESIS OF RECENT LITERATURE**

Creative Associates, Inc.

April 30, 1986

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Paula Goddard:	Deputy Associate Assistant Administrator
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The members of the advisory committee provided us with guidance and assistance; they also reviewed the various drafts of the report and provided valuable insights and comments.

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I. INTRODUCTION

This is the second volume of a report on Agency for International Development (AID) policy and programming in education. Under the direction of AID's Center for Development Information and Evaluation (CDIE) in the Bureau of Program and Policy Coordination (PPC), Creative Associates, Inc., conducted this study to examine the relationship between policy and programming in the education and human resources development sector.*

The purpose of this study is to analyze AID policy and programming in education in order to determine areas of disjunction and conjunction between them. The study responds to a growing concern within AID about the appropriate role the Agency should play to assist education systems in lesser developed countries (LDCs). It is hoped that this report will stimulate thought and dialogue among policymakers and technicians overseas and in Washington concerning the role of education in the development process. It is also hoped that this will lead to a critical and thoughtful appraisal of development assistance in the education sector.

The report consists of three volumes. Volume I condenses the analyses within the report and presents the major conclusions. Volumes II and III present more detailed discussion. Volume III focuses on AID's past experience in education, its current education policy, its education funding since 1980, and opinions of AID policymakers and technicians concerning AID's assistance for the development of third-world education systems. Volume III also contains the conclusions of the report, including suggestions for the next steps AID can take to clearly define its role in the education sector.

This volume, Volume II, presents a synthesis of recent developments and findings of the literature on the role of education and international development. The primary purpose of such a review is to demonstrate the effect of education on the lives of people in the developing world. This study is exploratory; it is not intended to be comprehensive in coverage, conclusive in its arguments, or primarily technical in orientation. It is intended, however, to provide policymakers, technical officers, project managers, and planners outside the education sector with the information necessary for making an informed appraisal of the value of investing in the education sector.

The research team worked closely with an advisory committee consisting of eight AID staff members from the Bureau of Program and Policy Coordination (see the Acknowledgements). The research team and advisory committee determined the focus of the study and the research methodology.

Over 50 publications concerning educational research as well as policies and programs implemented by major donor agencies were studied for the literature review. Based on advisory committee recommendations, sources

*This will be referred to in the report simply as the education sector.

included AID studies and evaluations, World Bank reports, UNESCO publications, and other materials from academia. A caveat concerning the figures cited in this report needs to be acknowledged. Those who have conducted research in the developing world are well aware that data may be somewhat out-of-date or inaccurate due to numbers having been inflated, deflated, or simply missing. The authors, however, realize that even if the figures themselves are not precise, they do indicate trends from which valid conclusions can be drawn.

Although the research team sought consensus on the issues considered, this was not always achieved. The team explored areas where differences of opinion exist; attempts to present these differences can be found herein. The intent is to encourage discussion and debate rather than present arguable conclusions.

II. EDUCATION'S CONTRIBUTION TO DEVELOPMENT

Although the effectiveness of various approaches used in assisting developing countries in the education sector is the subject of much debate, the fact that education makes a significant contribution to national development is undisputed. It is, therefore, no longer relevant to ask whether or not resources should be allocated to education. More appropriate is determining where funding can have the most impact. This section summarizes the most recent research that has been conducted concerning education's relationship to other development sectors.

A. GENERAL IMPACT OF EDUCATION ON SOCIAL AND ECONOMIC DEVELOPMENT

Educational activities have a significant impact on overall social and economic development. They do so by

- satisfying a basic human need for knowledge;
- providing essential skilled manpower for both the industrialized and informal sectors of the economy;
- developing the necessary knowledge, skills, and productive capacities of the work force;
- influencing present and future distribution of income and employment;
- acting as a catalyst in encouraging modern attitudes and aspirations;
- improving the physical quality of life through its indirect effects on health, fertility, and life expectancy; and
- increasing the effectiveness of investments in other development sectors.

Years of research conducted by the development community have led to the above conclusions and observations. A significant breakthrough in recent years has been the refinement of tools for measuring the contribution and effectiveness of education. Tools specific to economics as well as other social sciences have been used in attempting not only to capture but also to quantify the outcomes of educational activities. The following section will discuss the advantages and disadvantages of using the economic measurement of rate of return. After the monetary returns to educational investments have been identified, nonmonetary benefits will be discussed.

Indicators For Measuring the Effectiveness of Education

Rate of Return: Its value and limitations

Although it may be impossible to measure the rate of return to investment in education with precision, it is nevertheless useful to employ a cost-

benefit analysis approach for comparing alternative educational projects. Cost-benefit analysis can provide a theoretical framework for evaluating both the magnitude of an investment's costs and benefits and their distribution over time. The following measures are used in quantifying the benefits of educational projects.

- a) Private rate of return: measurement of the relationship between the costs and benefits of education for the individual.
- b) Social rate of return: measurement of the relationship between the social costs of education that must be borne by society as a whole and the socioeconomic benefits that are expected to accrue to society.

There are critics of the rate-of-return approach who contend that the figures calculated are not truly representative of the costs and benefits of investing in education. It is believed that earnings are not sufficiently accurate to be used as an appropriate measure of productivity; the earnings of those in the agricultural and informal sector are not duly taken into consideration. Calculating the social costs of a given investment is also an extremely complicated task.

It has been argued that higher productivity (as reflected in earnings) of those who attend school, compared to those who do not, is not due to the cognitive skills or knowledge imparted at school but rather to the fact that schools identify workers with superior ability and personal attributes (such as motivation and attitudes to work, authority, and modernization). Thus, schools primarily function as a screening device for the modern sector. Critics of human capital theory would, therefore, contend that education identifies productive capacities without necessarily enhancing them, simply providing credentials that can be used by employers as a means for selecting workers and determining their subsequent wages and salaries. This is termed "credentialism" or "the screening hypothesis."

Central to this hypothesis is the belief that education does not directly improve workers' skills and abilities. It is still a profitable private investment due to higher income levels achieved by the individual, but a lesser one for society. This has implications for the validity of cost-benefit analysis as measured in social rates of return to education investments.

Some of the controversy has, however, been diffused by the work of George Psacharopoulos. In making the distinction between "initial" and "persistent" screening, Psacharopoulos contends that there is little evidence that employers pay wages above a worker's productivity after the employee has undergone a trial period of observation. Initial screening exists, in the sense that a prospective employee may be hired due to projected productivity based on her or his educational attainment. Psacharopoulos believes that some sort of selection criteria is necessary and that education is a more efficient and equitable criterion than race, religion, caste, or social background. However, as access to educational opportunities and thus educational attainment are often determined by such factors, education may not be entirely neutral.

Rate of return has also been faulted for not being able to identify the indirect benefits gained by the individual through education. It is also believed that out-of-date data, an oversimplistic view of the labor market, and a limited understanding of the outputs of higher education may lead to over- or understating the actual rates of return at each level of education.

Although even its supporters would agree that the rate-of-return technique requires fine tuning, its value as a tool for ranking investment alternatives has not been challenged. Taking into consideration all the caveats regarding rate-of-return studies, some general patterns still emerge.

- The returns (both social and private) to investment in primary education are highest among all educational levels.
- The private returns to educational investments are greater than social returns, especially at the university level.
- All rates of return to investment in education well exceed the ten percent yardstick commonly used by developing countries to measure the opportunity cost of capital.
- The returns to education in developing countries are higher than the corresponding returns in more advanced countries (Psacharopoulos 1985).

In sum, rate of return, a technique used in cost-benefit analysis, can provide policymakers with a useful framework for ranking alternative investment options in the education sector. In realizing the limitations of the technique, specifically its inability to capture nonmonetary costs and benefits to investment in education, it has become increasingly clear that rate of return cannot be used in isolation as the sole guide for investment appraisal. Accordingly, greater attention has been focused by the development community on identifying and quantifying the nonmonetary or external benefits to education.

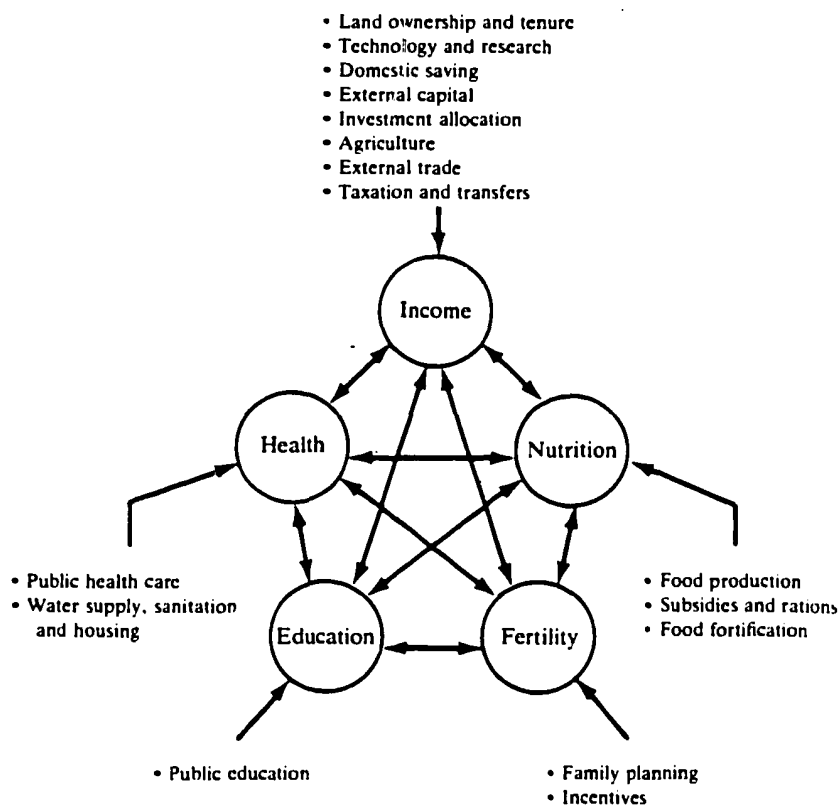
Nonmonetary and External Returns of Education: Intersectoral Relationships

In order to evaluate fully the costs and benefits of educational investments, it is necessary to examine the links between education and other sectors of development. The literature shows that educational activities can enhance development efforts in health, nutrition, population, and agriculture.

Education facilitates the entire development process by contributing to the success of development projects in other sectors. Very often the absence of important skills or lack of expertise in management areas has been the major reason for failure in a given project. However, training given to government employees and others whose skills are key to the success of a project can contribute significantly to its effective implementation and sustainability over the long term.

Experience has also shown that the overall educational level of an entire target population impacts on program effectiveness. Such audiences may be farmers who are being introduced to new agricultural techniques or rural women being urged to take advantage of a family planning clinic. Even for highly trained professionals, previous education can increase receptivity to new ideas. Education thus provides the fertile ground in which other development activities can flourish. Projects in agriculture, health, or population, for example, are not ends in themselves but are strategies for improving the quality of life for all. Rather than working in total isolation from one another, these elements form a seamless web of activity in which causality cannot always be readily identified (see diagram below). As Psacharopoulos describes this cycle, "healthy children learn more effectively than sick children, well-nourished children learn more effectively than hungry children, and educated parents are more likely to have healthy and well-nourished children" (Psacharopoulos 1985).

FIGURE II-1. INTERRELATIONSHIPS AMONG DEVELOPMENT SECTORS



Source: World Bank (1980), p. 69.

In other words, education has a significant impact on

- increasing agricultural and other productivity;
- lowering fertility rates;

- improving health and nutrition;
- encouraging the transfer of technology; and
- increasing participation of women and girls in development.

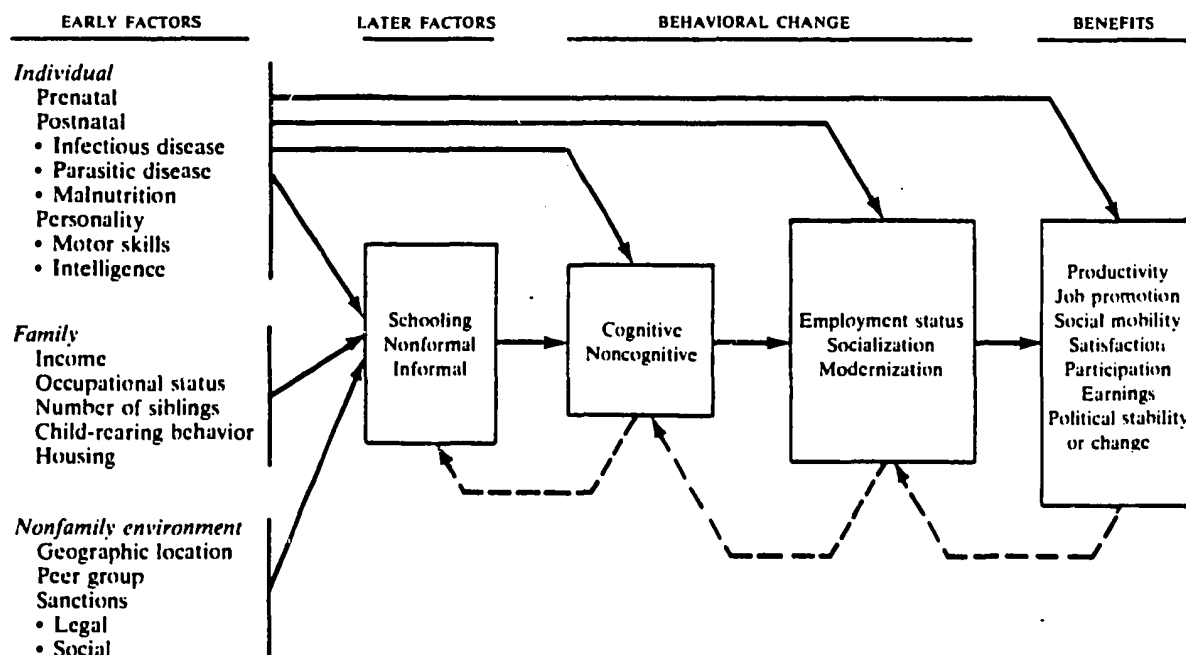
The following pages detail the cross-sectoral benefits to be gained by investing in education.

B. CONTRIBUTIONS OF EDUCATION TO OTHER DEVELOPMENT SECTORS

1. Education and Productivity

Education has often been a means of achieving social mobility and raising income levels. As illustrated in the diagram below, the most obvious benefits derived from education are those related to enhanced economic productivity.

FIGURE II-2. CAUSES AND CONSEQUENCES OF THE LEARNING SYSTEM



Note: Other arrows are omitted to maintain the clarity of the diagram. For example, Family and Nonfamily Environment should have dotted lines to Later Factors and Behavioral Change.

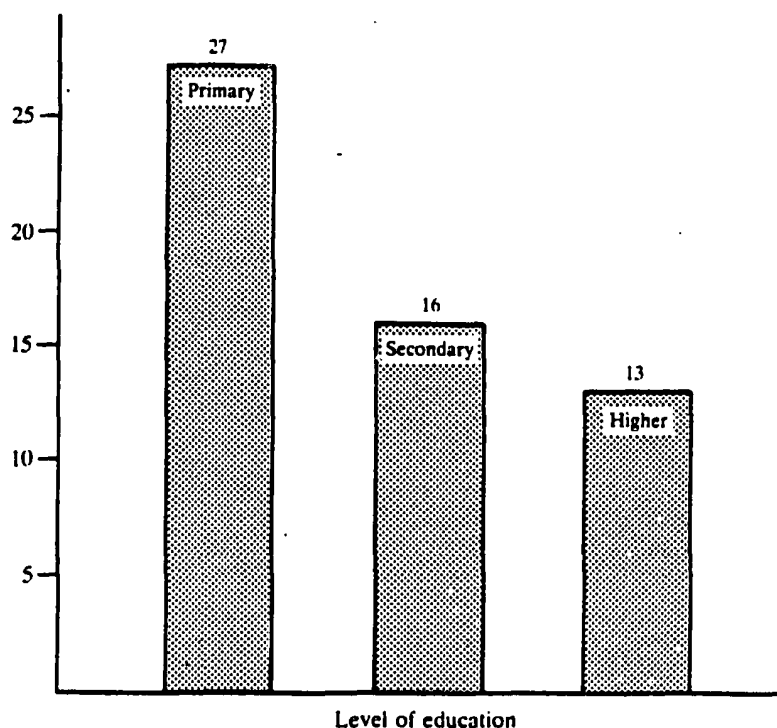
Source: Alexander and Simmons (1975).

Research has shown that educated workers receive higher wages than those who are less educated. Age-earning profiles have been devised for approximately fifty countries. The data collected from both developed and developing countries tend to confirm the conclusion that education enhances average lifetime earnings. These studies indicate the following.

- Earnings are highly linked to education; at all ages, highly educated workers earn more than those with less education.
- Earnings rise with age to a single peak and then flatten out or fall until retirement age.
- The age-earning profiles are steeper for higher-educated individuals than for those with less education.
- The higher the level of education, the later the age at which earnings reach their peak (Psacharopoulos 1985).

Monetary benefits derived from education have also been quantified in rate-of-return studies. Based on work in 22 developing countries, the social rates of return to investments in education are: primary, 27 percent; secondary, 16 percent; and higher education, 13 percent. It should be kept in mind that the private rates of return exceed the social rates, especially at the university level (Psacharopoulos 1981).

FIGURE II-3. SOCIAL RATES OF RETURN (PERCENT) TO INVESTMENT IN EDUCATION BY SCHOOL LEVEL IN DEVELOPING COUNTRIES



Note: "Developing countries" refers to twenty-two African, Asian, and Latin American countries.

Source: Psacharopoulos (1981), p. 333.

Increased Agricultural Productivity

Education has had a significant impact on agricultural productivity. Jamison and Lau (1982) have done extensive work in identifying a positive correlation between education and increased agricultural productivity. Their findings indicate that

- four years of schooling raise agricultural productivity by 7.4 percent; and
- when accompanied by the use of complementary agricultural inputs, output is increased by 13.2 percent.

Although a positive link between education and increased productivity is apparent, the root causes of this relationship have not yet been fully indentified. It has been clear for some time, however, that the new complex technologies of modern agriculture (e.g., new seed varieties, fertilizers, irrigation, and pesticides) could be employed more effectively if farmers were more educated. The link between literacy and increased agricultural output is becoming more apparent. In fact, Mingat (1984) suggests that the poor economic performance of agricultural projects in sub-Saharan Africa is partly due to the low literacy rate of the region.

There is mounting evidence (Lockheed, Jamison, and Lau 1980; Jamison and Lau 1982; Jamison and Moock 1984) that certain cognitive skills in language, science, and mathematics facilitate farmers' ability to produce more food. Though their work is still in the early stages, several researchers in both developing and developed countries have begun creating models illustrating the different levels of cognitive skills that farmers must attain in order to successfully make the transition from traditional farming to highly technical, capital-intensive agriculture.

FIGURE II-4. FOUR BASIC STAGES OF AGRICULTURAL PRODUCTIVITY AND THEIR LEARNING REQUIREMENTS

Farmer-entrepreneurs' technology level	Agricultural inputs	Minimum learning requirements
Level A: Traditional farming techniques passed from parent to child	Local varieties of seeds and implements	Addition and subtraction—not necessarily acquired through formal education
Level B: Intermediate technology	Small quantities of fertilizer	Addition, subtraction, division, and rudimentary literacy
Level C: Fully improved technology	High-yielding varieties; proven seeds; rate of application of seed, fertilizer, and pest control per acre	Multiplication, long division, and other more complex mathematical procedures; reading and writing abilities, and rudimentary knowledge of chemistry and biology
Level D: Full irrigation-based farming	All above inputs; tubewell access during the off-season; and water rates per acre	Mathematics, independent written communication, high reading comprehension, ability to research unfamiliar words and concepts; elementary chemistry, biology, physics; and regular access to information from print and electronic sources

Source: Heynenman (1983)

The chart on the previous page identifies the cognitive tools needed to take full advantage of the agricultural inputs relative to four levels of agricultural development. For example, rudimentary literacy and numeracy skills are needed by farmers so that they are not dependent on memorizing the one-to-one advice of an extension agent. Learning by rote is not only an expensive but also an inefficient method of acquiring new agricultural skills and knowledge (Heyneman 1983).

Impact on the Informal Sector

There is a dearth of information concerning the relationship of education to the informal sector, especially in urban or peri-urban settings. As previously stated, rate-of-return studies do not sufficiently consider those working outside of the formal sector. It has been noted, however, that in some countries there appears to be a positive relationship between years spent in primary school and frequency of participation in informal sector activities (Botswana 1974). Diversification and expansion of marketing activities often follows functional skills training. Also, in many countries the qualifications for most formal sector jobs have been raised to the point of precluding the participation of primary school graduates. Thus, people with lower levels of educational attainment are increasingly turning to the informal sector for employment (Colclough 1980).

2. Education and Fertility Rates

Evidence shows that as the level of education in a country rises, the fertility rate falls. Through the interaction of education with improved health and child survival statistics, fertility rates first rise with more education and then fall. It is generally agreed that the short-term effects of education on childbearing are an increase in fertility rates and a decrease in child mortality. The improved health of educated mothers and their children accounts for both effects.

The most comprehensive review of the relationship between education and fertility was conducted by Susan Cochrane in 1979. The focal point of the study was to demonstrate how education affects fertility by examining how it influences age of marriage, desired family size, and knowledge of contraceptives (the direct determinants of fertility). Although the relationship between fertility and education is not uniform, some general conclusions can still be drawn.

- Female education is more likely to be inversely related to fertility than male education.
- Education in urban areas is more likely to be inversely related to fertility than in rural areas.
- Education in countries with literacy rates above 40 percent is more likely to be inversely related to fertility rates than in less literate countries.
- There is tentative evidence that education will ultimately reduce fertility over time (Cochrane 1979).

The most interesting findings are those related to the effect of female education and economic productivity on fertility rates. A large part of the inverse effect of female education on fertility is believed to be due to increased employment opportunities available to women; Cochrane contends that participation in the labor market may mitigate against frequent childbearing.

Cochrane cannot offer exact explanations why increasing education decreases fertility rates. However, the fact that it does would appear incontrovertible. Although the impact of specifically male education on fertility rates has not yet been determined, it is clear that educating women and girls has serious implications for any national family planning strategy.

3. Education and Health

Education has a great impact on increasing life expectancy and reducing child mortality and morbidity. The explanation for this phenomenon is twofold. For households at a given income level, education provides parents with the skills, knowledge, and capabilities required to improve the nutritional content of their families' diets and to initiate earlier and more effective diagnosis of illness. Second, education, through its ability to increase productivity, raises income levels, thereby enabling households to spend more money on food, housing, and medical care. The end result is improved family health (Colclough 1981).

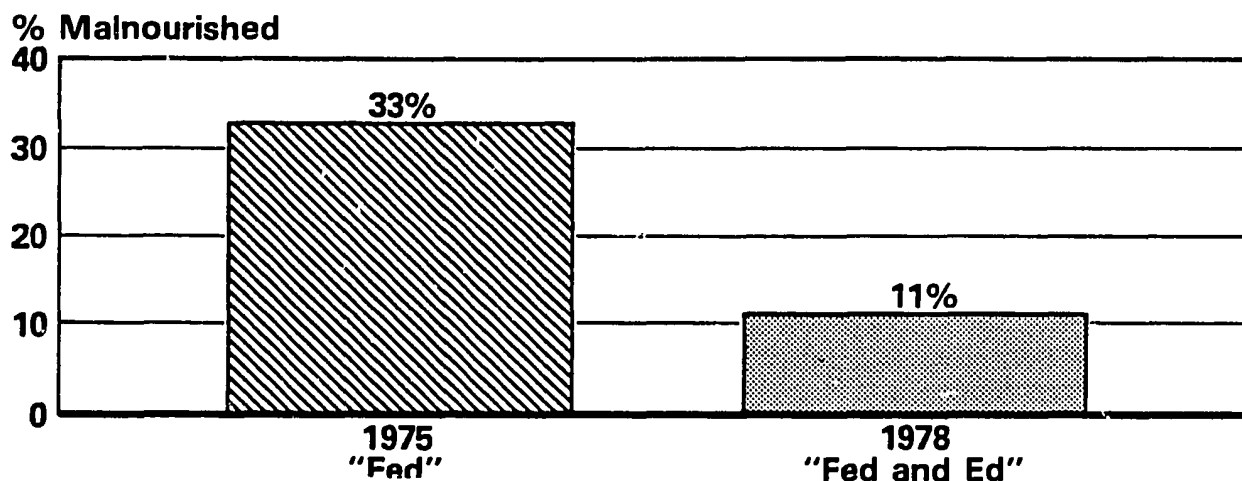
The educational level of parents has been shown to have a significant effect on the health of their children. The positive relationship between parental education and improved infant and child health appears stronger than that of parents' education and their own health. This may be due to the fact that the environment affects the health of children at a greater rate than adults. There is a strong inverse relationship between mothers' education and child mortality. On the average, one additional year of schooling for mothers results in a reduction of 9 per 1,000 in child or infant mortality. In cases of both parents being literate, the mortality rate may be further reduced by 27 per 1,000 live births.

A positive relationship between parents' education and children's nutritional status is apparent. Not only does formal schooling contribute to this, but nonformal education components to development activities can also improve feeding practices. This is borne out by the results of an evaluation of an AID-supported Food Aid and Nutrition Education Program in Morocco, graphically represented in Figure II-5. The evaluators concluded that nutrition education in conjunction with food assistance had a measurable impact on the mothers and children participating in the program. A comparison of the results of the food aid program before and after an educational component had been incorporated indicated that nutrition education increased the effectiveness of the program. The percentage of malnourished children participating in the program decreased from 33 to 11 percent.

The literature concludes that education affects health by way of higher income derived from greater productivity, better knowledge of diet and sanitation, earlier diagnosis and more purchase of cures, and a higher value placed on health care and prevention.

FIGURE II-5. EFFECT OF NUTRITION EDUCATION FOR MOTHERS
ON CHILDREN'S NUTRITIONAL STATUS

MALNOURISHED (<80% Expected Weight/Age-Children 0 to 5 Years)



Source: AID Project Impact Evaluation Report No. 8, 1980

4. Education and Technology Transfer

Experience has shown that the lack of acceptance of new technologies by their intended beneficiaries can be a major stumbling block to the success of projects in all development sectors. A review of AID evaluation projects in FY 1984 revealed that, at times, farmers will deliberately decline to adopt new technologies in spite of the fact that the required physical inputs and related extension services are available (AID Evaluation Occasional Paper No. 5 1985).

The Transfer of Health and Sanitation Technologies

The transfer of technology has been found to be more successful in health projects, according to the 1985 AID occasional paper. It should be noted, however, that securing acceptance of illness prevention measures (as opposed to curative services) is still proving difficult to achieve (AID Evaluation Occasional Paper No. 5 1985).

Education is also important in relation to transfer of water and sanitation technology. Clean water can contribute greatly to improving health, but whether it will do so depends on the relevant education and understanding of its intended users (Feachem et al. 1983). New wells may be of little use if the community knows nothing about sanitation and hygiene (Noor 1981).

The Transfer of Agricultural Technology

The adoption by small farmers of new agricultural techniques and inputs is central to the success of agricultural extension and research projects. Consequently, identifying the variables that contribute to or militate against the transfer of technology has been the subject of much research. In general, it is believed that education increases the facility and speed with which new skills and technologies can be learned, adopted, and implemented. In addition, education enhances the individual's ability to identify alternatives and then assess and compare the costs and benefits associated with each one (Jamison and Lau 1982). The findings below further strengthen the correlation between education and the transfer of agricultural technology.

- In Kenya, a farmer's level of education was positively associated with the probability of adopting hybrid maize varieties (Gerhart 1975).
- In a sample of Punjab farmers, education was positively associated with the farmers' adoption of new seed varieties (Rosenzweig 1978).
- In Thailand, research has shown that both education and extension strongly increase the probability of adopting chemical fertilizers (Jamison and Mook 1984).

Therefore, it is clear that investment in education should be an integral part of other sectoral investments in order to increase the overall effectiveness of development efforts. The literature indicates that the transfer of technology is more successfully achieved if the target population has been educated. Studies have been conducted to identify those noncognitive effects of schooling that may facilitate technology transfer. In general, individuals who were formally educated were found to

- be better informed;
- have a stronger sense of personal and social efficacy;
- be more open to new ideas, experiences, and people;
- value science more;
- accept change more readily;
- have a different sense of time; and
- participate more openly in social affairs (Inkeles 1974).

5. Education and the Private Sector

The term private sector refers to a vast spectrum of institutions that are nongovernmental in nature. The private sector is both a benefactor and beneficiary of educational activities. As benefactor, it provides financial

support to educational entities ranging from private schools for children to training institutes for upper-level managers. As beneficiary, the private sector draws upon that supply of manpower to augment its own productivity through enhanced efficiency and effectiveness.

It is clear that certain educational strategies can enhance and expand participation by the private sector. Efficiency can be improved by collaboration and coordination of the manpower needs of the modern sector with training institutions. Although this relationship is apparent, there is an absence of quantitative data reflecting this link. Employment statistics that differentiate between the public and private sector were not available. Below are some general observations that can be made regarding the relationship of education with the private sector.

Private Schools

Most governments have traditionally provided free or heavily subsidized education to the public. Faced with continuing enrollment expansion and in many cases with inadequate schooling capacity for the 6-14 age group, governments are realizing that official education budget allocations alone might not suffice and a greater involvement of the private sector might be needed in providing schooling for the young.

Private schools in the third world have a variety of sponsors and orientations. In some countries, a parallel private school system may be a vestige of a colonial past, such as the network of French schools operating in former French territories. Private schools may be community efforts as are the Harambee ("let's pull together") schools in Kenya. Religious affiliation is another common theme for the creation and financing of private schools. Examples of this are convents and missionary schools still operating throughout the world or the Aga Khan schools that serve Ismaili communities.

The share of private sector spending in education varies greatly by country. Statistics indicate that private education expenditure in most LDCs varies in range below 3 to 4 percent of total private final consumption expenditures (Tan 1983). Public education expenditure showed signs of leveling off in the early 1970s, and as a percentage of GNP, the expenditures stagnated in general. Since public sector spending is unlikely to increase significantly in the future, and may well decrease for some LDCs, increasing the involvement of the private sector in education becomes an issue.

However, the share of private enrollment declined as total enrollment increased since the 1960s. That decline probably reflects two facts. First, the expansion in enrollment has come primarily from poorer families, who cannot afford the cost of private schools and send their children to public schools funded or heavily subsidized by the government. Second, unless user fees are instituted or increased, there is no incentive for private education to expand or improve.

This is not to say, however, that families are unwilling to bear the costs of education. In fact, recent studies in educational financing have focused on the willingness and ability of families to pay for their children's

education. Preliminary results would appear to indicate that when education is a highly valued commodity in short supply even parents from lower socio-economic backgrounds may be willing to pay for their children's education, in spite of their likely preference for free or cheaper education (Tan 1983).

Cooperation between Public and Private Sectors: Donor Assistance to the Private Sector

Training and the Formal Sector

Because the limited quantity of trained manpower is a major constraint for developing countries, institution-building projects have been financed by donor agencies and government organizations to improve management and other skills necessary for enhancing the private sector. Experience has shown, however, that the training received is not always appropriate or relevant to the needs of modern industry. Linkages between the private sector and training institutions have, therefore, been recognized as central to ensuring that training is designed and conducted to enhance the efficiency and effectiveness of both systems. An example of such cooperation can be found in the technical/ vocational training programs instituted in South Korea. These programs made extensive use of part-time tutors who were working in the prospective employment fields of the trainees. Linkages were further strengthened by involving industry representatives in curriculum revision, equipment selection, counseling, and job placement of graduates. Evaluators of the Korean vocational/technical training programs have observed that graduates have found work readily and performed well on the job (World Bank, 1985).

Training and the Informal Sector

In recent years the contribution of the "informal" or self-employment private sector to economic growth has been recognized. Accordingly, donor agencies and private voluntary organizations (PVOs) have placed more emphasis on small private enterprise development. As a private enterprise is characterized as a "self-starting, self-motivating, self-directing, and self-rewarding activity that produces goods and services" (The President's Task Force on International Private Enterprise 1984), more training is focusing on the creation of entrepreneurial skills. The United Nations Industrial Development Organization (UNIDO) used training programs to foster the "need to achieve" and other risk-taking attitudes in its efforts to promote entrepreneurship. The results of these efforts were regarded as positive and were seen as producing an excellent return on investment.

Private Sector Sponsored Training

Training programs emanating from private industry itself are increasing. For example, in the United States, a consortium of firms including AT&T, IBM, and GTE created an institute that trains third-world participants in the application of telecommunications technology. This institute, in collaboration with the Academy for Educational Development, trained over 200 people from 65 developing countries in 1983. According to the 1984 report by the President's Task Force on International Private Enterprise, the program is

designed to introduce developing-country participants to the products, services, and technology of the U.S. telecommunications industry. Sponsoring businesses regard the program as a long-term investment that will eventually lead to commercial benefits.

Realizing that poor management is a stumbling block to economic productivity, the private sector is also stressing management training. An example of an indigenously operated training center is the Institute for Management Education for Thailand (IMET). IMET was founded in 1982 in Thailand with a \$1 million grant from AID. Four Thai management institutions joined together to design and teach training courses using U.S. business school models. Over an 18-month period, seminars were held for 1,000 male and female entrepreneurs. To ensure sustainability, American university professors were engaged to train teachers in Bangkok, thereby creating a cadre of Thai instructors in marketing, accounting, personnel management, and finance. There is no government participation in IMET; it is directed by a board of twenty leaders from universities and the banking/business community.

6. Education and Women in Development

Educational interventions--formal or nonformal--in developing countries have altered the traditional roles of men and women in society. It would appear that the access of women and girls to educational opportunities has extended the boundaries of their world beyond the confines of the home into the larger social, economic, and political community.

Illustrating this phenomenon is the experience of a Moroccan Women's Center, which provides its clients with food aid and nutrition education. The evaluators of the AID-sponsored project posited that the center was a key factor in providing an opportunity for women to share in the benefits of a broader community life. The impact of the center on the role of women in that country is summarized in the words of a Moroccan official.

It is very interesting to see mothers come out of this society, mothers ready for education to know new things for themselves. When a mother stays in the home she cannot participate in society. When she joins the center, this stimulates her development (AID Project Evaluation Report No. 8, 1980).

Research findings on the effects of education on development underline the important contributions that women have to make to the development process. Often the greatest impact on health, nutrition, and family planning can be made by educating and training women. As previously cited in this report, the literature indicates that:

- the better educated the mother, the less likely the child is to die in infancy;
- children of educated mothers are more likely to succeed in school, more so than if only the father is educated;

- educated women are more receptive to family planning and tend to have later marriages and fewer children; and
- education increases women's opportunities to find remunerated employment.

As witnessed by the citations above, research on the externalities to educating females has focused on women's/girl's role in the home and has neglected other spheres of female activity. A notable gap concerns the effect of education on the productivity of female farmers. One study conducted in Kenya found that the effect of schooling on output was greater for women than for men (Moock 1976). It was also seen that women did not benefit as much as men did from extension services for agriculture. The relationship between female productivity and education is clearly an area where further research is needed.

The education of women and girls has been termed by the World Bank as "one of the best investments a country can make in its future growth and welfare." Encouraging the access of females to education and training activities has consequently been incorporated into the policy of many donor agencies. Accordingly, the enhancement of female potential is currently regarded as both a goal and an important development strategy.

III. EFFICIENCY AND EFFECTIVENESS OF INVESTMENT IN EDUCATION SUBSECTORS

A. GUIDANCE FOR INVESTING IN THE EDUCATION SECTOR

The experience of the past three development decades has led to the conclusion that education plays a significant role in facilitating national social and economic development. The debate is no longer over whether resources should be allocated to the education sector, but how limited funds can be most efficiently and effectively targeted. General subsectors, or areas of potential programming, are:

- primary education;
- secondary education;
- vocational/technical education;
- higher education;
- nonformal education; and
- training both in-country and participant.

In order to determine where money in the education sector could most appropriately be spent, several factors need to be taken into consideration. These can be broadly classified into two categories:

- external efficiency; and
- internal efficiency.

1. External Efficiency

Evaluating the external efficiency of educational investments is usually based on the following criteria:

- the extent to which schools, universities, or training institutions provide sufficient numbers of individuals with the necessary skills for the smooth running of the economy;
- the extent to which school-leavers are absorbed into the labor market, find the jobs and the earnings they expect, and are able to use their skills in improving their productivity and the quality of their lives; and
- the balance between the costs of investment in education and the economic benefits as measured by the higher productivity of educated workers, thus reflecting the social rate of return (Psacharopoulos 1985).

2. Internal Efficiency

The internal efficiency of an educational institution or system is based on the relationship between that system's inputs and outputs. Examples of educational inputs are teachers, textbooks, visual aids, desks, and school buildings. Outputs are the knowledge, attitudes, skills, and behaviors acquired by students. Outputs are most often quantified by achievement tests or examinations. An internally efficient school is, therefore, one which produces the greatest number of graduates with the desired outputs at the least cost. The outputs are standards set by the institutions themselves. Not only are outputs measured in quantity, but quality is a significant factor as well. In discussing the internal efficiency of schooling, the quality of the education being produced is an important topic.

The following sections highlight some of the research findings pertinent to any discussion of internal and external efficiency. The first part will briefly touch upon the unique characteristics associated with each subsector as they relate to external efficiency. The remaining section will look at the various factors affecting internal efficiency.

B. EFFICIENCY OF INVESTMENT IN EDUCATION SUBSECTORS

1. Primary Education

A number of studies of primary education provide evidence that primary education is the most sound level of educational investments. Research on the linkages between primary education and fertility rates, health practices, attitudes toward economic risks and technological or productivity changes strongly suggests that completion of four to six years of schooling, not merely literacy, is the main explanatory variable for improvement. Research also indicates the following trends.

- The lower the per capita income of a country, the greater the power of primary schooling and its effect.
- Unemployment rates were lower for primary school graduates than for those without a primary education.
- The first criterion when hiring those at the bottom of the occupation ladder is the level and type of education received.
- Most of the redistribution of income within a society takes place through primary education (access to higher education is dependent upon completion of primary education) since the financing of higher levels of education disproportionately favors the better off.
- There is no quick or cost-effective means of raising the general literacy and skills level of adults in the absence of a basic schooling system of reasonable quality and coverage.

2. Secondary Education

There is a dearth of information concerning secondary education. The few references that exist stress the fact that the social rate of return of secondary education is much lower than the rate of return for primary education (16 percent versus 27 percent).

Another area of discussion with regard to this subsector is the employability of the graduates of secondary schools. One study states that there is growing evidence of increasing unemployment of secondary and higher education graduates throughout LDCs; in another document, the unemployability of the graduates of these two subsectors is considered to be only short-term. The debate is unresolved.

Findings do indicate that secondary education plays an important role in the development process. The expansion of primary and secondary schools is an integral part of rural infrastructure development. Also, there is evidence that those with more education tend to receive higher remuneration than those without (even in the same occupation) and that eventual occupational status, especially in LDCs, is dependent on the highest year of school completed.

3. Vocational/Technical Training

Even though most donors regard vocational schools in LDCs as not profitable, vocational and technical training continue to be funded nonetheless. Inadequate assessment has been given to whether unprofitability stems from macro-structural factors (e.g., little demand in labor market for training received) or from micro factors concerning quality of instruction received (Claffey 1982).

Research indicates that there is a tendency to work through public sector entities rather than private sector institutions. Recent efforts are being made, however, to strengthen linkages between the type of training offered and the employment needs of the private sector.

Studies on vocational and technical training highlight the following findings.

- Chronic limitations of many vocational education programs are their poor linkages with industrial sector employers.
- The focus of recent vocational education projects appears more often urban than rural.
- Though male participants still predominate, the number of female participants in vocational and technical training is growing.
- Few vocational projects have an income-generating component or a direct link with past or concurrent employment.

- Limited assessment has been conducted on how well participants master the intended technical, mechanical, construction, or commercial skills.
- Virtually no research has investigated how vocational and technical training programs respond to specific labor market demand, taking into consideration the level and quantity of technically skilled manpower required.
- Much of project funding appears to have been earmarked for construction of training centers, course development, training of teachers, and purchasing of equipment.

4. Higher Education

While the rate of return for investment in higher education is lower than that of primary education, it's better than the rate of return for physical capital investment in some LDCs. In eleven developing countries, the average rate of return for investment in higher education was 15 percent; 12.8 percent was the average return for physical capital investment (Seymour 1985).

Additional research indications include the following.

- Investment in liberal arts education can have a higher payoff than investment in technical fields given the lower cost of liberal arts education.
- The more educated workers are, the more flexible they are in the labor market.
- Accumulated evidence demonstrates that the provision of higher education will not significantly increase the number of unemployed graduates. When distinction is made between incidence and duration of unemployment, the evidence shows that in most cases unemployment is a temporary phenomenon concentrated in a few months upon leaving school. There is no evidence of graduates remaining unemployed for a number of years.

5. Nonformal Education

Nonformal education (NFE) is not a distinct and separate educational entity, parallel to the formal education system. Rather, it is an umbrella term referring to

any organized, systematic, educational activity, carried on outside the framework of the formal system, to provide selected types of learning to particular subgroups in the population, adults as well as children. Thus defined, nonformal education includes, for example, agricultural extension and farmer training programs, adult literacy programs, occupational skill training given outside the formal system, youth clubs with substantial

educational purposes, and various community programs of instruction in health, nutrition, family planning, cooperatives, and the like (Coombs and Ahmed 1974).

Due to the broad scope of NFE activities, evaluating the overall effectiveness of NFE as a development strategy is a difficult task. There is no comprehensive and systematic international evidence available (Coombs 1985). In part this is due to the fact that the diversity of NFE projects precludes the possibility of a measurement tool appropriate for cross-national comparison. The experiences of various donor agencies in this area do provide, however, useful insight into determining the weaknesses and strengths of nonformal education.

Efforts have been made to capture the economic returns of nonformal education projects. In a study conducted in four countries, it was demonstrated that NFE projects contribute positively to economic development (Woo and Eng 1985). Due to the limited scope of the research sample, this result should not be viewed as conclusive. This research is nonetheless valuable as it demonstrates the need for maintaining sufficient amounts of data throughout the implementation of NFE projects so that more economic analysis can be done in the future.

The following observations can be made concerning NFE programs.

- Nonformal education is done best by comparatively small, flexible organizations closely linked to the client population and operating autonomously from government institutions.
- Nonformal education projects on the family and community levels do not have a great impact, largely due to the failure to generate appropriate long-range goals.
- Projects dealing with development-oriented educational institutions and nationwide organizations have been more productive.
- While NFE may not require nearly the financial input that formal education does, it is heavily dependent on other types of resources, mostly low-cost or volunteer labor. Also, because NFE resources, programs, and settings vary, there are no standardized formulas for determining costs.
- Donors differ in their strategies and approaches to nonformal education. Many see it as supporting agriculture, health, energy, population, nutrition, and infrastructural development; others see it as a separate sector, sometimes having as its basic objective literacy and numeracy (Krueger and Moulton 1981).

6. Training (In-country and Participant)

Greater recognition is being accorded to the importance of training as a means of ensuring project sustainability and increasing local capacities. Many of the major donor agencies such as the World Bank and AID are accordingly targeting greater amounts of resources to project-related long-term and short-term training.

The World Bank has emphasized the cost-effectiveness of project-related in-country training. Studies indicate that its rate of return is very high: 50 percent and possibly more than 100 percent (depending on the opportunity costs of the training) (Mingat 1984). It was also shown that project-related training was also most effective in countries with literacy rates well above 40 percent, once again underlining the links between training and general education.

Although AID invests in some locally based training, the Agency's priority is on "participant training," AID-sponsored training of selected individuals in the United States (often in master's and doctoral programs) or in other (third) countries. Participant training is considered central to institution building. According to the Blueprint for Development, "training to help build an indigenous analytical capacity to conceive, plan, and implement development strategies and programs is a very important component of institution building." The principal objective of these efforts is to develop human resources and use them effectively in sustainable institutions. American institutions of higher education have been designated by AID to play a major role in providing training.

Participant training programs have been evaluated since the 1960s, consequently, a vast body of literature concerning that activity is readily available. However, evaluation studies focus on project outputs without regard to long-term outcomes. Recommendations refer to ways of improving the project's internal efficiency without relating it to broader goals. Thus, the participant training approach has not been evaluated in terms of its impact on institution building.

This gap has been duly recognized in AID. In the mid-1970s, a model was developed for evaluating the impact of participant training projects. The evaluation system was, however, never implemented. The need for such a system has resurfaced and efforts are again being made to devise an effective measurement tool. According to PPC/PDPR's Annual Budget Submission for FY 1987:

there is little consensus on the manpower development priorities for accelerating technology transfer and application capacities. Investment priorities both for countries and for assistance agencies are set as much by anecdote and argumentation as by agreement on objective needs and relative priorities. We assume, for example, that AID targeting of training funds helps to ensure that training is in priority fields and that funds are used most cost-effectively. We have little objective basis for this

assumption. A preliminary proposal has been received to study the differences in fields of study and return rates between self-financed students in the U.S. and AID-financed participant trainees.

C. EFFECTIVENESS OF EDUCATION: CRITICAL ISSUES OF THE 1980S

Developing countries have made great strides over the past twenty years in educating their citizens. World Bank statistics indicate that average enrollment in primary education has increased from 47 percent of the school-age population in 1960 to 93 percent in 1980 (in the 34 poorest countries). In the last twenty years, primary school enrollment in third-world countries has tripled. The demand for schooling has not yet been satisfied and, in fact, is increasing as parents recognize the benefits to be gained through education. However, further expansion of existing school systems appears to be out of reach for many developing countries due to mounting deficits and crippling debt payments. It is against this backdrop that improving the internal efficiency of existing educational systems becomes a central concern for third-world governments and donor agencies alike. Educational effectiveness is significantly undermined by:

- inefficient use of resources;
- the poor or declining quality of education;
- inappropriateness or irrelevance of education to employment needs;
- inequitable allocation of resources; and
- lack of equitable access to education.

1. Inefficient Use of Resources: Wastage and Repetition

As previously stated, internal efficiency refers to how efficiently a school uses its resources in producing an educated graduate. High dropout and repetition rates severely limit the efficiency of a system. Students who do not complete primary school are unlikely to have achieved mastery of basic skills; the resources spent on this insufficient education are wasted. Repeaters not only displace potential new students but require twice the resources to achieve the same end result as students who do not repeat a grade. The number of school leavers and repeaters is staggering.

- In many developing countries, less than 50 percent of students who begin will complete the primary school cycle.
- In Morocco only 24 percent of those children enrolled complete primary school without repeating.
- In Mauritius more than 25 percent of all primary school pupils repeat grades.

- Repeaters make up 15 percent of total enrollments in Latin America, 15 percent in Africa, and 18 percent in South Asia.

The ramifications of such statistics are overwhelming. Given the fact that acquiring basic literacy and numeracy requires four years of basic schooling, children who drop out of primary school fail to gain the minimum knowledge necessary for a more healthy and productive life. Since more than half the children who begin school in many developing countries drop out, this represents a terrible waste of educational resources and human potential. In addition, efforts to expand systems are frustrated by the high proportion of repeaters. The merit of having students repeat grades must also be questioned as recent studies show that there is no educational advantage to making low achievers repeat (Hadad 1979). Most importantly, countries that have not achieved universal primary education could increase capacity for enrollment ratios to 100 percent without having to increase either teaching staff or facilities by eliminating repetition (Psacharopoulos 1985).

Research indicates that dropout and repetition rates are highest among students from low socioeconomic backgrounds. These trends are more pronounced in rural versus urban areas, and among females rather than males (Psacharopoulos 1985). In general, wastage and repetition may be due to:

- poverty (hungry children have higher rates of absenteeism due to more frequent illnesses; when they are in school, hungry children don't learn well, all contributing to poor performances);
- cultural factors (which especially affect girls);
- inappropriate curricula and examinations;
- poorly trained teachers;
- lack of textbooks and materials;
- overcrowded schools; and
- a shortage of secondary school places.

2. The Poor and Declining Quality of Education

Although tremendous quantitative gains have been made by developing countries in building educational systems, this has not been paralleled in qualitative terms. Indeed, existing education programs at any level throughout the developing world are frequently of low quality (Congressional Presentation FY 1987).

It could be argued that any type of education, regardless of its quality, is better than nothing. However, put into the context of rapidly dwindling

resources, using limited funding to expand inefficient systems would appear fiscally unsound.

In some parts of the world, the quality of education is actually declining. A World Bank assessment conducted in Korea found that the quality of primary education had seriously deteriorated. Overcrowding and unfavorable staff-student ratios were cited as major reasons for this decline.

In general, the achievement rates of children in the third world may not be keeping pace with those of students living in industrialized countries. This is linked to a decrease or lack of educational inputs that are vital to ensuring quality. The primary level has especially suffered as the upgrading of teachers, school facilities, and the provision of teaching aids such as textbooks have not accompanied the rapid quantitative expansion. Research (Shuluka 1974; Heyneman 1980; Heyneman and Loxley 1983; Schiefelbein and Simmons 1978) indicates that internal efficiency may be improved by changing the combination or quality of educational inputs.

Teacher Training

Heyneman and Loxley (1983) have concluded that teacher quality appears to be a predominant factor in student achievement. Consequently, the need for improving teacher training and upgrading the skills of experienced teachers is of central importance. It is not known, however, what is the most cost-effective method of doing so. Preliminary research on teacher training suggests the following.

- Teacher experience is important in primary and lower secondary school.
- Teacher expectations of students are among the most consistently important variables in students' achievement. Positive teacher expectations produce positive results.
- Teacher upgrading programs have received little attention in the research literature, but initial results would suggest that such programs are effective.
- Skill and knowledge of teachers as reflected in salary or qualifications are more important in higher grades (Husen, Saha, and Noonan 1978).

Textbooks

The evidence of the relationship between the provision of textbooks and achievement is clear and consistent; there is a positive correlation between the use of textbooks and high achievement scores. Experience has shown that

- textbooks are often available, but unaffordable (Heyneman, Farrel, and Sepulveda-Stuardo 1978);

- less experienced teachers are less likely to use textbooks (Schiefelbein, Farrel, and Sepulveda-Stuardo 1983); and
- the provision of free textbooks (Mexico and the Philippines) indicates that textbooks are often the most cost-effective means of improving academic achievement and the increased efficiency of schools.

Research into the use of textbooks has by no means been exhausted. More information is needed concerning the cost-effectiveness of different types of textbooks (e.g., paper vs. hard-bound or locally produced vs. standardized). It is also still to be determined how the use of textbooks interacts with other variables (such as teacher quality) and whether textbooks are more effective and/or required in one subject than another.

Teaching Aids

Not only do textbooks enhance the quality of learning, but other teaching tools such as maps, charts, pictures, and other visual aids have a significant contribution to make. Industrialized countries allocate 14 percent of primary-school recurrent costs to such aids (including furniture), with the remaining 86 percent earmarked for teacher salaries. In Asia the proportion is 9 percent and 91 percent respectively, while in Africa it is found to be 4 percent and 96 percent (Psacharopoulos 1985). It is believed that a small adjustment in allocation could improve efficiency. Researchers have suggested that a minimum of 10 percent of recurrent costs be devoted to teaching tools (Heyneman, Jamison, and Montenegro 1984).

3. Inappropriate or Irrelevant Education: The Importance of Curriculum

Much criticism has been levelled at schools for not preparing their students for work. Criticism has been sharpest in respect to vocational and technical education. The need for making curriculum more relevant is apparent. It is thought that if employers are directly involved in planning the curriculum or providing the training, then vocational education will be more responsive to the labor market. This assumption has been borne out by the success of the Korean vocational/technical education program in which members of the industrial community had input into the forming of its curriculum (World Bank 1985).

It is also argued that, in the final analysis, a general curriculum may be more relevant than one with a vocational/technical orientation. In sub-Saharan Africa, it is believed that teaching practical, occupationally specific skills at lower levels of education while neglecting basic general skills has been in general unsuccessful and not cost-effective. Some would posit that labor market performance is better enhanced by providing graduates with a solid background in science and math. Such graduates are more adaptable to changing needs of the market as opposed to those possessing a set of narrowly defined skills.

4. Inequitable Allocation of Resources

Declining quality may in part be due to an inequitable allocation of central funds. Government sponsorship of higher education is an extremely costly endeavor relative to the small population it serves. In sub-Saharan Africa, costs per student at the university level are 700 percent of per capita income, whereas it is a mere 20 percent at the primary level (Psacharopoulos 1985).

Not only does the heavy subsidization of higher education lead to inequities in the distribution of educational benefits across socioeconomic and ethnic groups, but it dilutes the quality of lower levels as well.

The experience in Korea illustrates the negative effects of shifting resources away from primary to higher levels of education. In 1985, the world Bank assessed the impact of its lending of the past fifteen years to Korea. The greatest achievements were found in technical and vocational areas at the secondary, post-secondary, and university levels, as this was the sector targeted by Bank funds. In examining the entire system, it was discovered that the quality of primary education had seriously suffered. Other examples of lopsided resource distribution follow.

- The 71 percent of a school-age cohort with primary or no schooling share 22.1 percent of the available overall cohort resources in most of the developing world.
- The 6.4 percent who receive higher education use 38.6 percent of available resources.
- In Francophone Africa, 86 percent of a primary-school cohort share 15.7 percent of the resources. The 2.4 percent of that cohort who receive higher education use 39 percent of available resources.
- Individuals from nonagricultural households receive 2.5 times the amount of public education resources as their counterparts with farming backgrounds (Psacharopoulos 1985).

5. Lack of Access to Education

The statistics above clearly point out the disparities between the type of education received by children living in urban versus rural areas. Not only may the education delivered in rural areas be of inferior quality, it may be nonexistent.

Another group that has been excluded from educational opportunities is girls. Although the number of girls attending school has grown in proportion to total enrollment since 1960, female participation rates still lag behind those of males. The record for nonformal education has also been found deficient; statistics show that the number of female illiterates is growing at a faster pace than males. In fact, two out of three of the world's illiterates are women.

Donor agencies and host governments need to consider the question of equity not only from the point of view of meeting basic human needs, but also as a strategy for increasing the overall efficiency of development efforts.

- Expanding educational opportunities in rural areas encourages more rapid adoption of improved agricultural methods.
- A better-qualified female population will be able to make more positive contributions to economic development family welfare, family planning initiatives, and health and child care.

The relationship between improving internal efficiency and increasing access of education to traditionally deprived groups is a causal one. Due to shrinking resources, expansion of present systems as they function now is not believed feasible. The first step is to tackle the problem of inefficiency with the assumption that the savings to be gained will then be reinvested in expansion and outreach to rural populations, the poor, and rural and urban females.

One way suggested for increasing efficiency is through the decentralization of educational systems. This strategy ease the financial burden currently felt by central governments and ministries in developing countries and help make education more relevant to the local context. However, decentralization would require a reorganization of existing administrative systems and would have political implications. Thus, research is required before strategies for its implementation can be recommended.

CONCLUSION

A review of a representative selection of development literature as well as most current research indicates that education is a critical variable necessary for achieving improved agricultural productivity, increased economic outputs, better distribution of income and employment, improved health and nutrition, lowered fertility rates, greater participation of women in development activities, and adoption of new technologies. Although the studies do not claim direct causality between education and national social and economic development, they show that educating the populace is a necessary prerequisite to ensure those achievements.

Measures and tools specific to economics as well as other social sciences have been used to capture the impact of education on other development sectors and to quantify the outcomes of educational activities. Although some critics could argue that the measurements to quantify the outcomes, need some fine tuning, the general patterns in the findings have not been challenged. Analysis of the findings in the development literature reveals that investment in basic education opportunities is economically sound and developmentally desirable. Research has shown that investment in primary education results in higher percentages of socioeconomic benefits than investment in other sub-sectors. Monetary benefits derived from education have been quantified in rate-of-return studies. Based on work in 22 developing countries, the social rates of return to investments in education are: primary, 27 percent; secondary, 16 percent; and higher education, 13 percent.

Studies also highlight the positive correlation between basic education and increased agricultural production. Findings indicate that four years of schooling raise farmer's agricultural productivity by 7.4 percent; when accompanied by complementary agricultural inputs, output is increased by 13.2 percent. The correlation between education and increased productivity is strongly documented. Evidence on the linkages between primary education and fertility, health practices, transfer of technology, and attitudes toward economic risks strongly indicates that completion of four to six school years is the main explanatory variable for improvement. Given these findings, it is clear that investment in basic education, particularly where the literacy rates are low, is an economically beneficial endeavor and a needed development strategy.

The evidence strongly indicates that education facilitates the entire development process by contributing to the success of development activities in other sectors. The debate is no longer over whether resources should be allocated to the education sector, but how to allocate limited funds. How can AID identify the most appropriate educational interventions given the economic, social and political variables of a particular situation.

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